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## **CLAIMS**

- 1. A method of simultaneously isolating both nucleic acids (RNA and DNA) from the same sample weighing not less than 0.5 mg fresh, frozen, fixed or autoptic including the following steps:
  - a) digestion of a sample incubated in a lysing solution consisting of: a caotropic agent, a ionic detergent, a proteolytic enzyme and a reducing agent;
  - b) enzyme inactivation by using extraction with a mixture of aromatic alcohols and producing an organic phase, that was stored and added to a second organic phase;
  - c) precipitation of RNA by adding a precipitating agent to the aqueous phase and an aliphatic short chain alcohol;
- d) precipitation of DNA from the organic phase as reported in step b) by using a precipitating agent and a short chain aliphatic alcohol.
  - 2. Method in agreement with Claim 1 where the lysing solution used in step a) includes:
    - a caotropic agent, either urea or guanidine thyocianate;
    - a ionic detergent, either SDS or SLS;

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- a proteolytic enzyme: proteinase K, trypsin, chymotrypin, pepsin or pronase;
  - a reducing agent, either  $\beta$ -mercaptoethanol or ditiotreitol.
  - 3. Method in agreement with Claim 1 including also the addition of RNAse inhibitor in step a), b), or c) of the method, alternatively.
  - 4. Method in agreement with Claim 3 where the inhibitor is a Vanadyl ribonucleoside complex.
- 5. Method in agreement with Claims 1-4 including a nucleic acid precipitating agent, either tRNA or glycogen: alternatively added in step c) or step a) and also in step d) of the method
  - 6. Method in agreement with Claim 5 wherein the precipitating agent is glycogen.
  - 7. Method in agreement with Claim 6 where the final concentration of glycogen is no less than 10 ng/ml.
- 8. Method in agreement with Claim 7 wherein the final concentration of glycogen is no less than 50 ng/ml.
  - 9. Method in agreement with Claims 1-8 wherein the short chain aliphatic alcohol is isopropanol or ethanol.
- 10. Method in agreement with Claim 2 wherein the guanidine salt in lysing solution of step a) is selected30 from the group consisting of guanidine thiocyanate and guanidine hydrochloride using a concentration ranging from 1 to 4 M.
  - 11. Method in agreement with Claim 2 wherein the proteolytic enzyme in the lysing solution of step a) is proteinase K.
  - 12. Method in agreement with Claim 11 wherein the concentration of proteinase K ranges from 0.1 to 10 mg/ml and wherein the incubation with this enzyme is performed at a temperature more than 20°C.
  - 13. Method in agreement with Claims 1 and 11-12 including at the end of step a) of the method a supplementary addition of the proteolytic enzyme with subsequent incubation.

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14. Method in agreement with Claim 1 wherein the miscela of organic solvent and aromatic alcohol of step b) is phenol or a phenol/chloroform solution at acid pH, mainly between 5 and 6, and more preferably 5.5.

- 15. Method in agreement with Claim 14 wherein the volume ratio of phenol and chloroform is from 3:1 to 7:1 in the solution.
- 16. Method in agreement with Claims 1-15 wherein the aqueous phase is re-extracted with chlorophorm after the first extraction with aromatic alcohol following step b) of the method.
- 17. Method in agreement with Claims 1-16 wherein the excess salt is removed from the RNA precipitate obtained at step c) washing the pellet with a short chain alcohol diluted with deionised water.
- 18. Method in agreement with Claims 1 and 16, 17 where the aqueous solution at step b) and the deionised water are treated with DEPC.

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- 19. Method in agreement with Claim 1 where the aliphatic alcohol added to precipitate DNA in agreement with step d) of the method is isopropanol and the precipitation is performed incubating the sample at a temperature lower than 0°C.
- 20. Method in agreement with Claim 19 wherein precipitated DNA is washed with a saline solution including at least 5% of organic solvent and wherein this step is optionally repeated to remove traces of phenol from precipitated DNA.
  - 21. Method in agreement with Claim 20 wherein the saline solution is either citrate or Na Cl.
  - 22. Method in agreement with Claim 21 wherein the solution is Na citrate at a concentration between 10 and 200 mM with pH from 6.8 to 7.3.
  - 23. Method in agreement with Claims 1-22 wherein the biological material is represented by cell culture, tissue biopsy, tissue fragment or optionally by paraffin-embedded sections.
  - 24. Method in agreement with Claim 23 wherein the paraffin-embedded sections are first deparaffinised using an organic solvent
- 25. Method in agreement with Claim 24 wherein the organic solvent is either xylene or benzene-derived.
  - 26. Method in agreement with Claim 23 for extraction of viral nucleic acids from biological materials.
  - 27. Method in agreement with Claim 23 wherein the nucleic acid is RNA.
  - 28. Method in agreement with Claims 1-25 wherein the sample weighs no more than 20 mg and wherein the volume of lysing solution, in agreement with step a) is from 100 to 800  $\mu$ l.
- 29. Kit for simultaneous and separate extraction of RNA and DNA from fresh and fixed samples, optionally also paraffin-embedded, in agreement with the method following Claims 1-28, including a tube with a lysing solution, a tube with a precipitating agent, a tube with a RNAse inhibitor and instructions describing the method in agreement with Claims 1-28 and optionally sterile and RNAse free tubes, disposable knives and alumina.
- 30. Kit for extraction of viral nucleic acids from fresh, fixed or autoptic biological samples, optionally also paraffin-embedded, in agreement with the method following Claims 1-28 including one or more tubes with oligonucleotides specific for viral identification using PCR, instructions describing the

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method in agreement with Claims 1-28 and optionally tubes with reagents for retro transcription of RNA.